DOCUMENT RESUME

ED 467 094 IR 021 413

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TITLE	Searching for Educational Content in the For-Profit Internet: Case Study and Analysis.
PUB DATE	2002-04-00
NOTE	61p.; Paper presented at the Annual Meeting of the American Educational Research Association (New Orleans, LA, April 1-5, 2002).
PUB TYPE	Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE	EDRS Price MF01/PC03 Plus Postage.
DESCRIPTORS	*Computer Uses in Education; Data Analysis; Elementary Secondary Education; Internet; Learning Activities; School Surveys; Student Research; Teacher Attitudes
IDENTIFIERS	*Commercialism; *Technology Role

ABSTRACT

This case study investigates the commercialized nature of Internet content and the ways educators and students negotiate and talk about such content. In factoring in the economic and historical context of educational Internet content, this case study also addresses educators' evolving attitudes towards commercialism in the classroom. A survey was distributed to numerous teachers at Hillup Elementary, Homer Junior High and Walnutville High School (Iowa) in the Fall of 2000. According to the survey, the Internet's main function in the classroom was as a kind of library substitute. Other types of projects, such as telecommunication exchanges or Web page design, were a significant minority to projects asking students to do individual research-surf the Web for information about a chose topic. The Walnutville data correspond with a national study conducted in 2001 that found 94% of youth ages 12-17 who have Internet access said they used the Internet for school research. Sixty-one percent of all the teachers answering surveys in this study assigned in-class projects that involved individual research in a school computer lab, with every student working on his or her own computer. More than any other Web-based activity, then, Walnutville students were surfing the Web in pursuit of information on a topic they usually chose themselves, and writing up research papers or some kind of presentation using that information. (AEF)

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SEARCHING FOR EDUCATIONAL CONTENT IN THE FOR-PROFIT INTERNET CASE STUDY AND ANALYSIS

by Bettina Fabos, University of Northern Iowa, April 2002

Between 1995 and 1998, many images from numerous ad campaigns cluttered national magazines and prime time television, and celebrated Internet content as a means for revitalizing education. An IBM ad that appeared in the New York Times Magazine throughout 1997, for example, showed a black and white photo of three elementary-aged students surfing the Internet. "Test scores have improved. Attendance is at its highest," the ad read, "But what's really incredible is that this picture was taken during recess." Of course, IBM's educational utopia featuring kids so inspired by on-screen learning that they can't bear to take a recess was one vision of Internet technology. How different would the real-life Internet learning experience be in Walnutville?

Most research on educational Internet use has focused on the technology itself and addressed issues of access, the process of using various Internet tools, and the way such technology has influenced teacher-student relations. This case study, however, emphasizes the content delivered over the Internet instead of the technology itself. Specifically, this case study investigates the commercialized nature of Internet content and the ways educators and students negotiate and talk about such content. In factoring in the economic and historical context of educational Internet content, this case study also addresses educators' evolving attitudes towards commercialism in the classroom.

Accordingly, I ask the following questions: How would Walnutville teachers be introducing Internet content to their students (grades 3-12) and planning their curriculum

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around this still-emerging tool? What sort of content would students be drawn to as they conducted school research? How would both teachers and students be negotiating the increasingly commercialized Internet environment? And what kinds of critical discussions, if any, would teachers and students be having about Internet sites that they accessed in school?

According to the survey distributed to numerous teachers at Hillup Elementary, Homer Junior High and Walnutville High School in the Fall of 2000, the Internet's main function in the classroom was as a kind of library substitute. Other types of projects, such as telecommunication exchanges or Web page design, were a significant minority to projects asking students to do individual research—surf the Web for information about a chosen topic. The Walnutville data correspond with a national study conducted in 2001 that found 94 percent of youth ages 12-17 who have Internet access said they used the Internet for school research (Pew, 2001). Indeed, 61 percent of all the teachers answering surveys in this study assigned in-class projects that involved individual research in a school computer lab, with every student working on his or her own computer. More than any other Web-based activity, then, Walnutville students were surfing the Web in pursuit of information on a topic they usually chose themselves, and writing up research papers or some kind of presentation using that information.

Case Study Framework

My research mainly focused on teachers, media specialists, and students in three technologically progressive schools within the same school district—an elementary school, a junior high school, and a high school. Based on a survey and the

recommendations of principals, media specialists, and fellow teachers, I selected 15 teachers and media specialists in these three schools who were most apt to integrate Web content in their classrooms (three elementary teachers and one elementary media specialist; four junior high teachers and one junior high media specialist; four high school teachers and two media specialists). Through interview and observation, I examined the various ways these educators encouraged their students to surf the Web environment. I also examined how students and educators searched and catalogued online materials, the kinds of Internet content they advocated in the classroom, and the opinions they had formed about sponsored online resources and other commercial elements of the online environment.

I also located three classrooms from among the teachers in my study, to observe--one classroom at each school in which students engaged in free-form searching during class time on a specific research topic. Free-form searching was an important element to track. By observing students doing this popular in-class activity, I could better judge whether or not commercial interests influenced student searching activities. I unobtrusively observed students conducting online research at the 6th grade, 8th grade, and 11th/12th grade levels and recorded these observations as field notes.

For additional data, I used a more in-depth method that combined both observation and interview. For this step, I interviewed 20 students (seven at the junior high level and thirteen at the high school level) as they searched for Internet information related to their class projects. Adapting the "think aloud" interview method for my purposes, I videotaped students' computer screens and talked to them to get them to verbalize their decisions as they surfed the Web. Thus, I was able to visually document

the choices they made as well as the surfing strategies they used, all the while keeping their identities private. I supplemented these 20 student interviews with other student data: 43 Web critique assignments that students completed at one point during the semester (I analyzed 16 assignments at the junior high level and 27 at the high school level), and other finished projects—the result of in-class Web research.

Web Research in the Classroom: Educators and Students

Three themes emerged from the interviews and observational sessions I conducted with the teachers, media specialists and students in this study. First, the educators steered their students to search engines, advocating free-form Web searches during class time. Moreover, students relied on search engines for nearly all their academic—and other—research. Second, discussions about Web content were prevalent in the classrooms I studied. Numerous teachers were concerned that their students locate "quality" Web content for their research projects and incorporated some level of Web page evaluation in their teaching. These lessons were, on a number of occasions, accompanied by graded assignments that asked students to analyze the validity of online Web content. The extent to which students used these strategies was one of the most interesting components of this research. Third, participants in this study generally did not consider online commercialism to be bothersome or troubling, and treated the Web itself as a neutral and relatively unchanging medium.

In organizing the data generated from a year of interviewing and observing educators' and students' online research practices, I have divided my discussion of these three themes into two parts: First I discuss the educators: the way they relied upon

search engines, the discussions they had about evaluating online content and the related assignments they gave, and their efforts to critique the Web as a whole. Second, I discuss the students: their attitudes about online research, their researching habits, and the degree to which they incorporated Web page evaluation skills in their online searching.

Educators

Relying Upon Search Engines

Teachers and media specialists regarded search engines as the most obvious and efficient way to find information on the World Wide Web. They had faith that their students could find trustworthy informational sites related to a particular topic of study using search engines. They also, by and large, trusted their students' searching skills. Many used the word "savvy" to describe their students' search engine habits, and marveled at what they saw was an increasing dexterity with online material.

Sixth grade teacher Melanie DeBower, for example, asked her students to search for online facts when she taught units on wetlands and famous people. Her students incorporated the information they found into a HyperStudio project and a written report, respectively. DeBower easily justified sending her students to search engines: most had computers at home and were already used to conducting free-form searches on the Web; others with less search engine experience could benefit from such activities. She also found that pre-selecting sites for her students was often prohibitively time-consuming on her end, and that her students enjoyed being "set free" on the Web.

Both 9th grade English teacher Miriam Lowell[1] and 7th grade science teacher Joe Doherty also let their students search the Web during class time, although they often asked their students to begin their searches by visiting a number of sites they chose ahead of time. For her Odyssey and Renaissance units, for example, Lowell gave her students a handout containing specific URLs (she created a WWW page with links to these sites) as a way to get her students on the right track. "I give them a starting place, that's the way I phrase it," she said. "This is your starting place. Get into the links, at least two or three of the links you should be looking at, and then go from there." Similarly, Doherty directed his students to the NASA page or other government resources before letting them explore the Web independently. Surfing, he explained, was an important lesson in and of itself:

> I do think that's important because some of our kids have vast amounts of experience with the Internet and some have none, and so I think it's important for them to have that opportunity and go on there and surf about, and we take a couple of days where I know that some time will be killed. Necessary evil I think. Just to get the experience of wandering around that great big vast array of information.

Jack Stroh, who co-teaches an 8th grade elective called "Electronic Learning and Technology" with Miriam Lowell, was a particular advocate of free-form Web surfing during class. To facilitate an even wider use of search engines, Stroh adjusted the Internet portal in the school's Mac Lab (normally set to Yahoo!) so that a list of 21 search engines appeared on the screen with their accompanying logos. As the most technologically literate instructor in the junior high school, Stroh had faith in his

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[1] Lowell also taught an 8th grade elective called "Electronic Technology and Learning" with her colleague, Jack Stroh.

students' ability to research diverse topics and find factual information by typing in applicable key words. He was encouraged by what he felt was his students' emerging Web proficiency.

High school teachers in this study also tended to assign research projects that welcomed, and even required Web research. Of the five papers English teacher Trina Matthews assigned over a given semester, four of them required her 11th/12th grade students to use Internet search engines. Biology teacher Dutch Hurley assigned two or three research papers a semester to his upper level students. These projects were so integrated with the Web that Hurley welcomed his students to design Web pages in lieu of written papers, which incorporated links to relevant sites. Social studies teacher Ted Rockenbrodt assigned multiple Web research projects to his four U.S. History (9th and 10th grade) classes and his Developing Nations (11th and 12th grade) class. English teacher Scott LeRouge also assigned research papers that required in-class Web research in both his advanced and lower level English classes.

All these teachers—elementary, junior high, and high school—reserved time in one of the school's computer labs so that students could search the Web for these assignments. The media specialists at the elementary school and the high school also facilitated student research projects in the media center when students visited during reserved class time or during free periods. "The Internet has just opened everything up," high school media specialist Karen Truax said. "I just think that students feel like there's little information that they can't find." For these educators, the World Wide Web was a library of facts and search engines were the most logical pathways to these facts.

Navigating "Quality" Content

Even as they embraced search engines, the teachers and media specialists I talked to fully recognized that much of the information available online was not appropriate for student viewing or relevant for factually-based assignments. Search engines were chaotic places and the lists they generated were as full of garbage as they were of great facts. The challenge for many of these educators, then, was to help students wade through a large number of Web sites and find the kind of unbiased and trustworthy information they needed to complete a fact-based research assignment. Educators generally had three strategies for doing this. First, at least for the lower grades, they did the search engine wading *for* their students, getting on search engines themselves and locating applicable sites to introduce in class. Second, they taught power searching strategies to generate more relevant search result lists. And third (and by far most common) they taught Web page evaluation techniques so that their students could better judge the validity and quality of individual Web pages on their own.

Pre-selecting sites. A number of educators in the lower grades ensured their students visited appropriate Web content by pre-selecting "quality" sites for their students to access during class. Hillup's media specialist, Jill Whitmore, was perhaps the leading advocate of Web site pre-selection. She felt strongly that the Web was too huge a database for elementary students to handle, and sending students all over the Web on fact-finding missions was a waste of classroom time. Accordingly, she advised teachers to select quality sites ahead of time. Realizing this could be time consuming, Whitmore offered to help by passing around a sheet once a month asking teachers to designate topic

areas that she might investigate for them. Whitmore also advocated educational subject directories like KidsClick, that are developed by K-12 media specialists, librarians, and educators. "We preview textbooks for kids," she said. "There's a whole selection criteria. We should be doing the same for Web sites." Whitmore was so bent on pre-selection that she was working on creating her own list of Web sites that could be accessed through the Hillup's online library database.

Third grade teacher Judy Valencia had taken a cue from Whitmore, and tended to search for sites beforehand rather than let her students look for sites themselves. She had watched one of her students mistakenly open up a porn site while doing research on Olympic figure skater Michelle Kwan, and from that point on decided to search for quality sites on her own. Like Whitmore, she also thought free-form searches wasted instructional time, but admitted that finding applicable sites for particular class units took *her* time (she had not yet relied upon Whitmore's assistance). Consequently, she often did not have enough hours in the day to do these searches. Valencia's alternative to pre-selecting Web sites was sending her students to "safe" subject directories that offer lists of sites already pre-screened by "content experts" or "academics," and organized into basic categories (e.g., Art, Education, Science). Her directory of choice: Yahooligans.

At the junior high level, 8th grade English teacher Suzanne Rommel also felt more comfort in pre-selecting Web sites for her students rather then letting them loose on search engines. Besides finding Web pages herself for particular units (e.g., on the Holocaust and on certain authors), she was particularly pleased with her textbook, Prentice-Hall Literature, which suggests applicable URLs in her teacher's edition (not the student version). "It's all there, it's absolutely great for us," she said. "Here are the Web

sites that you might go to and here's where you might find the answer." Although Rommel relied upon her textbook as a kind of directory to Internet sites, she had little or no knowledge of online subject directories such as Brittanica.com or AOL@school. Indeed, only a few teachers I talked to at the junior high and high school level had heard of these services. Most felt they were not worthwhile or too elementary, preferring to send their students to search engines instead.

Power searching the Web. Introducing students to "power searching" techniques was common at both the junior high and high school but not in the elementary school). Power, or advanced, searching refers to the use of Boolean operators (e.g., and, or, not) to more successfully narrow down a Web search, and knowing the differences between various search engines. In the 8th grade elective Stroh and Lowell co-taught called "Electronic Learning and Technology," they asked their students to complete an online tutorial that took them through the basic concepts of Boolean syntax as it related to the Web.[2] Students worked on the tutorial during one or two class periods (depending on how quickly the student learned that material) and took a graded quiz on the concepts they learned.

At the high school level, media specialists Karen Truax and Sandy Ingersoll discussed Boolean strategies to all tenth graders at the beginning of the school year as part of their library orientation. They mainly applied this discussion to the school's subscription-based Internet databases available through the high school media center, although they also explained that the same methods could be used for many search

[2] http://www.curtin.edu.au/curtin/library/staffpages/gwpersonal/searchut/index.html

engines. Some teachers invited the school's media specialists to their class for a refresher session on Boolean search terminology and Web page critique strategies. English teacher Trina Matthews, for example, asked Truax and Ingersoll to talk to her 11th and 12th grade classes before they began working on their Web research projects. English teacher Scott LaRouge also touched upon the basics of Boolean operators in his own classes and discussed a number of search engines he found to be the most useful (e.g., Sherlock and Google). Other teachers, like social studies teacher Ted Rockenbrodt, felt confident that the sophomore library orientation was sufficient for his students, and believed that his students applied Boolean strategies during their Web searches at home and in school.

Evaluating Web pages. To many of the educators in this study, the Web was easily tamed—and was the tremendous resource it promised to be—if students could learn to distinguish good content from the bad. Following the liberal-humanist tradition of critical reading, which values truth, objectivity, and attempts to identify author intent (see Cervetti, Pardales and Domico, 2001), a good page in this context was one that offered straightforward, trustworthy, and factual information; a bad Web page was one that demonstrated obvious bias and had sloppy, misleading information. With search engines gleaning such an abundance of good and bad Web pages, these educators felt that learning to wade through the "garbage" also offered a means for learning critical thinking skills; the more pages students had to wade through the better their critical thinking skills could become. With these skills, the Web as an overwhelming database could also be surmountable. As such, the majority of the teachers and media specialists I spoke to made admirable efforts to educate their students about the potential biases of various

kinds of online materials, and ways to distinguish between good and bad content. "Kids don't always know what's real and what's not," high school biology teacher Dutch Hurley remarked. "And I think that's good. Part of the whole learning process is that they have to sift through what's garbage and what's real."

Echoing much the same advice advanced in the academic literature on Web page evaluation, nine of the fifteen educators[3] interviewed for this study focused on ways to determine author and site validity. Many of them followed much of the same criteria—"Authority, Accuracy, Objectivity, Currency, and Coverage—as discussed in Chapter Four.[4] Since these criteria put an emphasis on the individual Web content author and his/her expertise in a given subject area, the discussions teachers and media specialists had with their students tended to highlight (as does much of the current literature) the notion that Web sites authored by ordinary people are the most likely sources for misinformation over the Web, and are responsible for making Web searches so unwieldy. Seventh grade science teacher Joe Doherty was typical of the teachers I interviewed:

> I mean, anyone can put anything they want on the Web. I can make up my own site and say 'I am the Ozone watchdog for the Midwest.' I could make up some name and call myself some society, and I could put any cacamana on there and I think I could and some people do!

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[3] Hillup: Jill Whitmore; Homer: Jack Stroh, Marnell Lyle, and Joe Doherty; Walnutville HS: Steve LaRouge, Trina Matthews, Dutch Hurley, Karen Truax, and Sandy Ingersoll.

[4] Most teachers had gathered information for such discussions from education articles passed along to them at conferences, and at Internet workshops held by the local education agency or in-service teacher training.

Because "anyone can put anything on the Web," (a phrase that kept recurring in numerous discussions I had with teachers and media specialists), the Web page evaluation methods at Hillup, Homer and Walnutville High School placed a priority on establishing Web page authorship. At the elementary level, media specialist Jill Whitmore (and not the Hillup teachers themselves) handled such discussions for the school's 5th and 6th grade students. "We go through a checklist of criteria for a good site," she told me. "Is there an author, a creator? When was it last updated? Is it an '.edu' or a '.com?' Where is this person coming from? Do the links work?"

At the junior high and high school levels, class discussions about untrustworthy authors and their potential biases happened more frequently and even spontaneously. For example, when both seventh grade science teacher Doherty and high school biology teacher Dutch Hurley asked their students to investigate current scientific events online (projecting a certain Web page on a screen to generate class discussion), they would bring to their attention the dubious nature of some Web pages. Describing his teaching, Hurley explained:

> We look at what's real science and what's not real science, and I incorporate some of the Web sites that we found by accident. Human cloning is a big one. There are millions of sites out there that claim that they've cloned humans and if you send me $300 and some DNA I can clone you and stuff. And we look if this is real or if this is not.

High school English teacher Trina Matthews also referred to biased author pages in larger discussions about language use. In three of her upper level composition classes she took her students through a sample essay that presented itself as a factually-based document. After highlighting words that indicated the writer's bias, she extended the lesson by stressing the ubiquity of biased resources online and the "misinformation on

personal pages," which can contain similar language styles. Similarly, in his goal to have his students be "efficient users of the Internet," high school social studies teacher Ted Rockenbrodt frequently interjected advice about domain names as his students were researching during class-time, "so that they know if they go to Joe's Basement page, that's not where I want to be for valid information, whereas Tulane.edu, you're probably going to get some good stuff there." Generally, these educators deemed Web pages that had no identifiable author but were created by a known organization or company (and looked professional),[5] more sound and truthful than pages created by individuals.

Some teachers developed Web page evaluation units that spanned days or even weeks. For their eighth grade elective "Electronic Technology and Learning," discussions about the Internet and Web content were quite remarkable. Stroh and Lowell developed a three-week long unit called "The Internet," which was broken up into Terms and Concepts (email, the World Wide Web, Internet Service Providers), Web Page Evaluation (domains, author validity, meta-tags, link investigation), and Search Techniques (engines and directories, Boolean operators, metasearch, local sources). They worked from materials they had collected at the state's annual educational technology conference and from handouts from the Area Education Agency. One article from the monthly newsletter Classroom Connect was particularly informative in their teaching: "Information literacy and the Internet: How to sort "good" online information from the bad" (Information, 1996).

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[5] In Chapter 4 I discuss what I call the "aesthetic of credibility"—an aesthetic that satisfies many of the credibility criteria (e.g., contact information, good grammar) without necessarily being credible.

For their discussions on Web page evaluation, Stroh and Lowell focused on Web author validity and site objectivity. As noted in Chapter 4, it's a common practice among teachers and librarians to begin discussions about authorship validity by defining domain categories, explaining their differences, and issuing warnings about certain URL addresses that could indicate misinformation or bias. For one class period, Lowell explained individual domain categories with the use of a handout (See Appendix G). "You have a fighting chance if it's an ".edu" that the information will be accurate," Lowell said, and explained that "safe" domains such as ".edu" can be misleadingly objective. To illustrate, they highlighted the infamous Web page authored by Northwestern University professor Arthur R. Butz,[6] who makes claims that key events documented about the Holocaust didn't happen. Stroh and Lowell discussed the way authors can seem reputable on the outset (like Butz appearing on a university server), but espouse extremely biased points of view. An academic-sounding ".edu" site should not be trusted unconditionally they warned, noting that a URL with a tilde is an indication of a potentially untrustworthy page.[7] Stroh and Lowell also told their students not to automatically exclude .coms as biased and opportunistic, and gave the example of a "beautiful and informative" page about the Sistine Chapel renovation that is sponsored by an air conditioner corporation keeping the climate controlled for the renovation.[8] They

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[6] http://pubweb.northwestern.edu/~abutz

[7] The tilde keyboard symbol (~) is an element within a URL that can indicate a Web site has been created by a person (usually a faculty member or student) borrowing university server space. As I discuss in Chapter 4, warning users about tildes is a prominent theme in the current literature.

[8] See http://www.global.carrier.com/ca/cda/details/0,,CLI1_DIV1_ETI8,00.html#return

also discussed other criteria with which to judge a page legitimate: its currency and whether or not a visitor could email the page's author.

Stroh and Lowell joined other educators in viewing sites designed by individual people—personal pages—with the most mistrust. They advised students to visit the online bookstores Amazon.com and Barnes&Noble.com to see if Web authors had also published reputable books—a helpful way, in their view, to help determine an author's legitimacy. They also discussed ways for their students to identify the type and number of external pages that chose to link into a particular site in question (e.g., go to the Alta Vista search cell and type "link:" and the site's URL). A site was presumed more legitimate if numerous sites linked to it from their Web page.

Stroh and Lowell integrated their Web page evaluation discussions with a number of assignments on Web domains and author validity. They designed the "Email Project" to give students a sense of the different kinds of information they could access; students had to email information requests to a commercial, noncommercial, and government Web site of their choice. The "Domain Search Activity" was meant to orient students towards the different kinds of information under each specific domain. Students had to choose three out of five Web sites Stroh and Lowell had pre-selected under each of the six domain categories (.gov, .edu, .org, .com, .net and .mil). For every Web site the students visited, they were asked to follow at least two links to get a better sense of the overall site. Then they had to write brief summaries of the type of information they found. The "Civic Activity" was meant to familiarize students with community Web pages. Students had to visit the Walnutville city Web site and review some of the listings they found

there. According to Lowell, all of these activities were meant as an orientation to Web page evaluation, an "introduction to the process."

The Internet unit occurred at the first half of the semester, and was followed by a unit on Computer Graphics that introduced students to digital cameras and other technology accessories. The last unit, called "Web Page Building," occupied the last month and a half of the semester. Students began the unit learning the basics of Web page design using a Claris Home Page tutorial. Then Stroh and Lowell assigned the "Web Page Design Activity": Students had to pick a topic that they had covered (or were about to cover) in another class, and apply the Web researching and evaluation techniques they learned earlier in the semester to gather online information and visuals. They then had to use the information and graphics they found to be the most credible and build their own informational Web page. Stroh and Lowell also required that students document their Web sources, define the Web source's domain, write down the individual or group responsible for maintaining the site, and document what other sites linked to their source sites. If they found images they wanted to copy onto their own page, they had to write an email to the Web source, get written permission, and site the source on their completed Web page. Finally, they had to identify three meta-tags that defined the site (by gong to View-Source on their Web browser to access the HTML code). In determining a site's meta-tags, Stroh and Lowell wanted to make students consider the way a particular site positioned itself within the context of search engine searches.

All these exercises were meant to help students decide if their sites they chose for their research were valid and trustworthy. Indeed, this list of activities was both ambitious in scope and unusual at the 8th grade level. In subsequent semesters, Stroh and

Lowell decided to place the Internet unit and the Web Page Building unit closer together. According to Stroh, students had forgotten much of the power searching and Web page evaluation skills they had learned by the time they had a chance to apply them.

High School English teacher Scott LeRouge, like Stroh and Lowell, also endeavored to teach his students Web page evaluation skills in his two Comprehension and Perception classes. He had been teaching some form of Web page evaluation since 1996, and during the semester I observed his class he was teaching an entire unit on Internet research. He introduced the unit by showcasing his favorite search engines (Sherlock and Google), reiterating "power search" strategies, and outlining the various Internet domains. The bulk of the unit, however, was spent on Web page evaluation, and was informed by the same Classroom Connect article used by Lowell (Information, 1996), as well as the online document, "It Must Be True, I Saw It On the Net: Real Research On the WWW,"[9] which LeRouge received at an Area Education Agency workshop in 2000. Drawing upon the recommendations in this Web page evaluation tutorial and his own Web researching experience, LeRouge spent an entire class period critiquing the Web page "www.designer-drugs.com," which featured an article called the "Future Synthetic Drugs of Abuse" and a list of pro-drug-related links. While his students scrolled through the article and other links on their individual computers, LeRouge pointed out various elements that deemed the article's author, and the Web page itself, either trustworthy or troubling. This is an excerpt of LeRouge's class lecture:

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[9] See Davis, Dee (2000, Fall). "It Must Be True, I Saw It On the Net: Real Research On the WWW" [Online]: http://www.aea2.k12/ia.us/tutorials/rsearch/mustbetrue.htm. (Accessed 28 January, 2002).

> If you look at this it seems pretty reputable. It seems to be set forward in a scholarly format, there's a nice solid title. There's a person, David A. Cooper, he has a pedigree, Drug Enforcement Administration, Maclean Virginia, yeah, the home of the FBI. So in fact you'll see that you also have an index at the very outset, and that particular index is basically a page where you can scroll up and down that page.
>
> As you look at it then again it seems set up in pretty straightforward, almost scholarly fashion. You have the introduction that lists the hallucinogens, the sub groups to hallucinogens, stimulants, sedatives, etcetera. If you scroll down so you have the introduction in the middle of the page, I want to show you things that are seemingly pretty solid bits of information, and he introduces this, a kind of attractive prose style, kind of that quasi-scientific style, with a lot of passive verbs in it. You know "It is determined," those types of things.

LeRouge continued to illustrate how a seemingly scholarly, relatively current page (he showed his students how to determine currency by selecting "View" and "Page Info" on the browser) had some suspicious links: Future Opioids (http://opioids.com), a "pro-drug rant" that led to other peoples' rants about the orthodoxy of self-medication; The Good Drug Guide (http://biopsychiatry.com) that called itself "The responsible parent's guide to healthy mood-boosters for all the family"; and BLTC Research (http://www.bltc.com) that promoted "paradise engineering" to "abolish the biological substrates of suffering." Besides pointing out the pro-drug bias of the Web page links appearing alongside this particular article, LeRouge also asked his students to do an author check on David A. Cooper by inserting his name into the search engine, Google (this was a similar strategy to Stroh and Lowell, who recommended plugging a Web page author into the Amazon.com database). Because the same article (but none others) appeared on multiple sites, LeRouge illustrated how this author's name was potentially fabricated, or how the author had less credibility than someone listed within the context of a larger, known organization. "If you can't find anything else by him," he said, "I would probably hesitate to use him as a major source. I might use him as a secondary

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source, but not as a major source." Like Stroh and Lowell and their focus on the Arthur R. Butz Web site, LeRouge was directing his critique on a singular Web page author who held a particular point of view. The currency of the Web site, and the presence of contact information, were also priorities in determining the Web page's credibility. LeRouge's message was consistent with Stroh and Lowell: Web page bias and misinformation is rampant on the Web, and one has to be a sleuth in the search for factual information.

LeRouge assigned two activities for the Internet Research unit. First, he asked his students to conduct online (and other library) research on a topic of their choice and write a fact-based research paper. Second, he assigned an "Online Critique," a checklist of 13 questions which students had to apply to one particular Web page they had found for the topic they were researching. The 13 questions came from the same Classroom Connect newsletter mentioned above (Information, 1996), and were meant to help students differentiate between "good" and "bad" Web content. For example, the handout asked students to consider authorship, target audience, motivation, currency, and coverage, and to compare the Web page with any library materials they may have found (See Appendix F).[10] LeRouge scheduled three class periods for students to conduct online research and complete their Web critique, which they had to write up and hand in. As they worked, LeRouge spent these class periods visiting with individual students and continuously helping them sift through the legitimacy of particular Web sites. In this particular discussion, LeRouge talked to one student researching Ritalin as they both viewed the Web site http://www.breggin.com:

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[10] This document is also available at http://www.classroom.net.

LeRouge: This guy has a clear bias, what's his clear bias?

Student: To keep kids off.

LeRouge: To keep kids off of Ritalin. Okay? He's a medical doctor, it says M.D. Now we don't know if he's a general practitioner, we don't know if he's a family doctor, we don't know whether he's a podiatrist, for crying out loud. Okay? "Founder of the International Circle of Study." Okay, he's the founder....okay....that says something...Where is this coming from. It's a .com. So this is a good thing you might want to critique, because while this says one thing, this says another. What do you suppose that links to? Go ahead and click it...see what happens...(reads). Let's see. Oh, make payment in dollars. Twenty-five bucks. So here is a question. If it's a nonprofit organization, right? It's going to send you a button, you're going to send them $25. How much does it cost to put up a Web page as an M.D.? Do you really think he can afford a Web page? So that's an interesting one. I would take it with a grain of salt. Again, some of the information may be interesting information that you may be able to check against other information that you get. But if you were to critique this site, you may want to make a point of saying what kind of information...does he have any links to any other sites, is there any bias to the author, you can say "Yeah..." You might also ask "why is this information online." You can say the guy put this information up to inform. On the other hand he's also making money for a supposedly nonprofit organization and trying to encourage membership. That's what I would do.

This student would later choose this Web page for his 13-question Online Critique.

After all students had completed their critiques and handed them in, LeRouge visited with each of them individually as he returned their papers. During these impromptu teacher-student sessions, LeRouge reiterated what he wrote down on their critiques: he pointed out that a page that was not recently updated was suspect, that nothing on the Web should be trusted until the Web page and Web author satisfied numerous authorship, accuracy, objectivity, currency, and coverage criteria, and that commercial pages (".coms") featured potentially compromised information. Even then, LeRouge recommended that the Web page be cross-listed and compared to other online

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information on the same topic, and he frequently suggested that students email the author for additional source ideas.

Accepting Online Commercialism

The time and effort these teachers dedicated towards helping their students become better readers of Web content was considerable. In their classes, Stroh, Lowell and LeRouge were bent on helping students evaluate the Web on a page by page basis and discard content when Web page authorship did not seem reputable. Since most of these critical discussions focused on individual pages (and their individual authors), not the Web environment as a whole, the educators in this study largely avoided discussions about the Internet as an evolving commercial medium. Indeed, their perspective stood in great contrast to the way a majority of teachers in the 1930s regarded in-school commercialism True, these educators generally found banner ads, marketing schemes, and lengthy search engine lists to be annoying, but they strongly felt that these elements could be overcome with persistent Web page evaluation and other preventive measures.

Online advertising. The educators in this study had varying levels of discomfort with regards to the busy, ad-strewn environment their students were regularly accessing. Homer Junior High's media specialist, Jeb Ashton, felt strongly that ads in school were unethical. "Is it related to product selling, or is it related to education?" he asked. "What is their primary purpose? It's selling." Hillup's media specialist Jill Whitmore saw banner ads as a distraction to her students, and, like Ashton, was wary of an abundance of commercial messages in the classroom. English teacher Trina Matthews also thought

banner ads were somewhat intrusive to her students while they conducted online research in class. "I know that they're usually searching for specific topics and specific items," she said, "and it seems like the advertising pops up a lot."

Most of the teachers and media specialists in this study generally felt that banner, pop-up, and interstitial advertising was somewhat annoying but did not unduly influence their students or Web content one way or another. The following comments were typical:

> It's kind of annoying to me, you know, when you go to a site and there's this flashing commercial at the top. You have to scroll down to get what you want. I don't know. It's everywhere...it's on TV, it's on radio. Why not the Web?? (Melanie DeBower, 6th grade teacher).

> It drives me crazy, personally. As far as the teaching aspect of it, I guess I don't have anything to say. It's something we're never going to get rid of. It's out there now and it's everywhere. I think that from a personal use standpoint, there are some tricks out there that drive me nuts, where if you go to a site they automatically put in your name there...I think it's just one of those things we have to live with (Dutch Hurley, 11th/12th grade biology teacher).

> We have magazines with advertising, and you know, I guess I don't [think about it] very much. The only one that gets me is the one where the students think they are closing the window and it takes them to a site, and they end up downloading something (Karen Truax, high school media specialist).

If online advertising was annoying, most teachers also felt that it had little effect on their Internet searching experiences:

> Kids are bombarded everywhere with commercialism, everywhere. And so I don't know how big of an impact all this stuff has on the kids (Miriam Lowell, 9th grade English teacher).

> I'm just used to [advertising]. Anything they come to is advertising. And I think I'm like everyone else here...I'm immune to it. The only time I

> ever go to advertising is if I accidentally click on it. So, I think they're much the same way. I've never really talked to them about it (Ted Rockenbrodt, 9-12th grade social studies teacher).

> I don't know, you're living in America, you know, you're in a capitalistic society, and the kids are pretty savvy to that, in a way. I don't think that they are unaware that everything comes with a little price tag and a little hook for advertising there (Joe Doherty, 7th grade science teacher).

Doherty (quoted above) was one of the three teachers at Homer with his own Web page, and his page—a packaged template from the commercial Internet company Tripod—had its own banner ads, the "price tag" for using the company's Web page template (he didn't have to spend the time constructing his own) and hosting service. Doherty's general perspective, then, was that online commercialism was a modest trade-off for quality services and free information.

Teacher Jack Stroh also felt online advertising had little consequence, and seemed even less obtrusive than commercial media. In a discussion on Internet Service Providers, for example, one student announced that he received a free computer after hooking up with a particular company (i.e., an arrangement similar to ZapMe!). Stroh queried the student: "But you have to deal with ads, right?" The student said "yes," and Stroh remarked that he might be a little inconvenienced, but was still getting free stuff—a fair trade-off. During another discussion, this time about digital car radio, Stroh noted that a $9 subscription to an online radio service would only bring about ten minutes of commercials. "Not too bad," he said. "I don't know what it is now for broadcast radio, but I bet it's more than 10 minutes." For Stroh, ads were somewhat disagreeable, but they did pay the bills for the content and services a person might want or need.

Consequently, because they felt online advertising was somewhat annoying but did not unduly influence their students or Web content one way or another, banner ads were not a component of educators' Web page evaluation at Hillup, Homer and Cedar Falls High School. In other words, teachers and media specialists did not consider the type of ad on a Web page (as Reynolds & Plucker, 1999, suggest) as an indicator of content quality. If banner ads were not addressed at the level of individual pages, they were also not addressed as a component of the entire Web environment.

Profiling and marketing schemes. If they were not overly concerned with the presence of online ads, most of the teachers and media specialists I talked to were also not concerned with games and contests, either, most of which were advertised with banner and pop up advertising. A few educators were, however. Games and contests most often request users to reveal personal information to be sold or used for other marketing strategies, and the issue of Internet privacy came up twice in my discussions with teachers and media specialists. For these educators, it was important to help their students understand that a person's online privacy can be invaded by commercial and other interests. They made attempts to teach students how to avoid privacy encroachments, and as such, critiqued the Web as a whole, not just Web page by individual Web page.

At Hillup Elementary, for example, media specialist Jill Whitmore instructed her students never to release their names, email addresses, or any other private information online. As much as being worried that her students would be preyed upon by unsavory marketing schemes—such as games and contests—she was also worried that suspicious

characters would attempt to contact her students, and she gave them strategies to avoid. Whitmore also talked to her 5th and 6th graders about the way cookies work. She explained the difference between "good cookies," which can give a user access to valuable resources (such as the school's WorldBook Online encyclopedia subscription) and "bad cookies," which build marketing profiles on Web users according to their preferences, and according to which Web sites they chose to go. To help her students distinguish between "good" cookies and "bad" cookies, Whitmore adjusted the preferences on the media center's computers so that a student was constantly warned whenever a cookie was being sent. She said:

> We've taught kids that just because it comes up and says "do you want to select a cookie" you can quick check in the second line if it says "in this server" or "any server." If it says "this server" I have the kids go ahead and click "ok" and you're done with it. If it says "any server" in the domain I have them click "cancel," and it'll ask you again and it may ask you a third time, but if you click "cancel" it will go away, and so they don't take cookies that way.

Whitmore wanted her students to know that computers may be monitored by outside entities (via cookies), and that it should be their decision what they wanted to share, and whether they wanted to accept a cookie or not. She was arming them against a potentially harmful commercial environment.

Stroh and Lowell also set out to make their 8th grade students aware of the privacy trade-offs that accompanied online communication and exploration. "I guess I've come to a point in my thinking that there is no privacy, really, on the Internet," Stroh said. "And it's better to teach kids that. It's not a place to put private information or to believe that you're actually connected to just one person." Because of the inevitability of

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profiling initiatives and the presence of Web commercialism, Stroh believed he could protect students against these incursions by making his students aware of them in class.

As part of their 8th grade "Electronic Technology and Learning" elective, for example, Stroh and Lowell assigned three or four reading selections drawn from current newspapers and magazines that centered on five topic areas and led towards discussions about technology issues and the Internet: Privacy (censorship, copyright, personal freedoms); Education (today's technology in education, global education); Consumerism (e-commerce, savvy consumerism, gadgets, games & toys); Society (careers, impact of technology on today's society); and The Future (development of new technology, scientific or medical technology). "Both of us read journals on the Internet," Stroh explained, "and these were the issues we picked out that were the most common, that people were writing editorials about." These articles sometimes spurred discussions that touched upon the commercial nature of the Internet.

In previous semesters Stroh and Lowell had actually assigned articles directly having to do with privacy and commercialism—articles about junk e-mail, the selling of personal data, and cookies.[11] For example, they assigned a *New York Times* article

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[11] The articles are as follows: Simons, John (1997, May 12). The battle over spam gets ugly: Critics take aim at junk e-mail. U.S. News & World Report, 122(18): 55

O'Mally, Chris (1997, January). Snoop: Welcome to a small town called the Internet where everyone knows your business. Popular Science, v. 1: 56-61.

Slatalla, Michelle (1998, April 2). Cookies may annoy but they don't hurt. New York Times, p. **XX**

Napoli, Lisa (1998, September 29). Judge throws out request to view cookie files. New York Times, p. **XX**.

entitled "Cookies May Annoy But They Don't Hurt."[12] The article argued that cookies were essentially harmless data collection, but Stroh provided a print-out of the cookies found on his home computer and explained how to delete cookie files, asked students to go home and locate the cookies on their family's computer, and quizzed them on the role of cookies. Stroh and Lowell did not assign any articles on "privacy" and "consumerism" during the Fall 2000 semester when I conducted this study, but occasionally touched upon the issue of Internet privacy during other class discussions about Napster, computer viruses, and the residuals of technological arrogance.

Interestingly, teachers at the high school level were not interested in discussing privacy issues with their students. I was told repeatedly that because students did not use passwords to log on to computers, they weren't establishing profiles and preferences on school computers, and were thus untouched by cookie profiling. Essentially, the high school teachers and media specialists in this study did not consider cookies or other privacy measures important because these issues didn't affect students' in-school experiences.

Lengthy and commercialized search engine lists. Because most educators in this study embraced search engines as the most effective and trustworthy means of finding quality Web content, there was little reason for them to critique such popular tools. Individual Web pages were worthy of criticism, not the tools that located them. Even if commercial search engines often generated huge numbers of hits, which they found to be

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[12] Slatalla, Michelle (1998, April 2). Cookies may annoy but they don't hurt. New York Times, p. **XX**

potentially annoying, they also felt their students were still finding relevant information and that search engines did not debilitate student research. As one high school media specialist remarked:

> I think sometimes [students] get frustrated because they'll type something in and the first things that will come up, say they are researching depression...the first things that will come up will be advertising for you know, psychologists, you know that kind of thing. But usually they can also find something worthwhile, you know the mental health association or something like that as well.

Most were generally happy with the way search engines functioned. Moreover, educators did not foresee search engines changing dramatically in the future, question search engine effectiveness (given the ever-exploding number of Web pages online), or question the commercial nature of search engines as private companies intent on making profits beyond banner ad sales. When asked to consider the likelihood of commercial influences on Web content via search engines and other means (e.g., synergistic advertising strategies sending users to a handful of popular sites, which in turn become increasingly "relevant" to search engines; paying for prominence on popular or education-oriented subject directories), teachers by and large were not aware and not concerned.

High school social studies teacher Ted Rockenbrodt believed search engines' navigation services would actually improve in time with the increased competition among search engine sites. "I have full confidence in the private sector," he said. "...that as we have more Web pages, they're going to have more sophisticated search engines." With better search engines (provided by the private sector), a sound knowledge of advanced "power" search techniques, and good Web page evaluation skills, Rockenbrodt believed students would be able to find the sites they were looking for. For him, the fact

that the Web was becoming more and more privatized was its biggest asset. He remarked:

> I think there is still going to be plenty of really good stuff out there for us to find. And whether they are prioritized, and whether it is the free enterprise system entering into it, I guess that's just part of it. But I still think we're going to find good stuff...If we [teachers] can't find online documents, then we're not expecting them [students] to. We're probably not seeing what we're missing anyway. I suppose that's a defeatist way of looking about it, but...

In summary, Rockenbrodt believed noncommercial sites would either trickle down through the many commercial sites and irrelevant personal pages, and if they didn't, that was too bad—what we don't know can't hurt us.

If Rockenbrodt's assignments are any indication, he was far less interested in critiquing the Web as a whole than he was in embracing the Web as a vehicle for free enterprise. One research assignment he developed, for example, was meant to be a lesson in Internet abundance: teaching students how so much information—arcane details—was available online. The assignment was for his Developing Nations class, which he taught to 11th and 12th graders. Students had to pose as tourists/business people and use the Web to design an itinerary for a business trip to a South American country. In teams of three, they had to use search engines to locate "facts" about car rental prices, restaurants, hotels, travel, and a company that paralleled their chosen business interest. Students found, for example, that in Brazil, a Ford Explorer costs $60/day, the Pizza Hut in Rio doesn't serve forks with their pizza, the American continental breakfast at a luxury hotel comes with the room price, and tourists can ride mountain bikes through the Amazon EcoPark. "Kids love to do this," Rockenbrodt said. "They love to search." Indeed, students were enjoying themselves as they investigated their country. One conversation I

overheard went as follows: "Do we all want to stay in the room together, or have separate rooms?" "Oh, I think separate rooms would be okay." "Oh look, we can reserve a suite of rooms!" Meanwhile, Rockenbrodt urged his students to bolster their itineraries with more and more minute facts. "I don't want you to print off a bunch of crap from the Internet and hand it in," he said. I'm looking for detail. Find all the things, present it nicely, and show me what I need to see."

Since Rockenbrodt's students were asked to locate facts that by and large concerned commercial enterprise, they had no problem finding the information for which they were looking. Car rental agencies, hotels, and restaurants like McDonalds are going to have high profile Web sites. But Rockenbrodt did not provide a framework for understanding the Web as a commercial medium beyond the notion that lots of commercial information was indeed available online.

Rockenbrodt's full confidence in the Internet as a commercial educational medium was an extreme case. Other teachers were more contemplative of the future of the Internet as a mass medium and its evolving role in education. Seventh grade science teacher Joe Doherty, for example, initially saw the Web as a decentralized medium that would remain essentially democratic, safe from commercial domination, and as such, navigation tools such as search engines to be non-problematic. He argued that all perspectives would eventually trickle down and through the Web, and remarked, like Rockenbrodt, that commercial forces would never succeed to effectively distort the information flow—that some countervailing force would always prevent that from happening. When Doherty began comparing the Internet to television and cable

industries, which are dominated by a nearly complete corporate monopoly, his argument began to change. In acknowledging that there are very few television programs that are critical of a corporate and/or media culture, he also acknowledged that a privatized Internet may also limit critical discussions about the economic, political and cultural issues that are crucial for democracy. In making these connections, Doherty observed that despite numerous for-profit educational initiatives, "the best educational sources [on the Internet] are from educators."

Doherty wasn't the only teacher I talked to who was grappling with the Internet as a commercial entity and with commercial search engines as the obvious tools for searching that entity. High school biology teacher Dutch Hurley, who was one of the many who saw the value of students "sifting through garbage" and enhancing critical thinking skills, also noticed his students wasting too much time searching for usable Web sites in his classroom. For certain kinds of assignments, at least, Hurley was beginning to think that subject directories, carefully prepared by educators, would be more useful to him and his students than search engines.

Jill Whitmore, Hillup's media specialist, took this notion one step further. If Rockenbrodt represented one end of the continuum—utter faith in commercial search engines and glowing praise for the Internet as a privatized mass medium—Jill Whitmore represented the other end: She mistrusted the Web as a commercial medium and was doing something about it. Whitmore was already combating her students' growing comfort with search engines (at home and school) by teaching her 5th and 6th graders Web evaluation skills, discussing cookies and other privacy issues, and promoting

noncommercial subject directories like KidsClick to her fellow teachers. KidsClick,[13] was established by media specialists in New Jersey and based on the non-profit premise that "providing an objective information service for children is not compatible with simultaneously targeting them with marketing." A group of K-12 media specialists, rather than a staff at Yahoo! or AOL@School, hand-pick KidClick's Web selections according to their educational utility and value. Whitmore believed that such efforts were crucial to the Web's future as an educational tool; for her, media specialists and teachers, not commercial forces, were the ones who should be responsible for locating Web pages and maintaining education-oriented subject directories.

Whitmore felt so strongly that her students were detrimentally reliant on search engines, which in her view were overly commercial and a giant waste of time during Internet lab sessions, that she had begun to create a noncommercial subject directory on her own. One reason was to steer her students away from overly commercial sites and towards what she considered high quality, credible sites. Another, and perhaps a more important reason in her view, was to steer her students towards *existing library resources* in addition to her selection of "quality" Web links. Using her knowledge of mark record cataloguing, Whitmore had figured out how to integrate live Web site links into Hillup's online catalogue and was self-sufficiently building her own directory, selecting sites according to the same criteria she was selecting other library sources. Her evolving online directory allowed students to locate the Web sites she selected through the same search terms they would use to find books, thereby merging *all* library resources—books, CD-Roms, videos, Internet sites—into one coherent database.

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[13] http://www.kidsclick.org

A main worry for Whitmore was that students, in her experience, increasingly rely on Web sites, not books, for all their information. "I really feel with the way the Internet is going as a resource that we have an obligation to do this," she said. "The beauty of it is that it's within the library catalogue. What we need to do is broaden kids' scope in terms of looking at the way kids do researches." She got the idea from the Follett Software product WebPath Express. WebPath Express is essentially a card catalogue software program with links to a commercial educational subject directory called "Webivor."[14] Whitmore liked the concept behind the WebPath Express software—pre-selected and categorized Web links that made up one aspect of a larger library catalogue—but she was not impressed by Webivor's site listings or the price: about $1000 for the initial yearlong subscription and $700 for annual renewals. Instead, she merged her own pre-selected Web sites into the school's established online data base. In doing so, Whitmore was attempting to contain the Web within the structure of the library catalogue, where it was beyond commercial control. Whitmore even had plans to make her online library resource the Internet portal page for Hillup Elementary, rather than the commercial portal used at the time of the study: Yahooligans.

Whitmore's cataloguing efforts, which really were in the fledgling stages and not yet utilized by other teachers at Hillup, were nevertheless inspiring from my point of view. Most of the educators in this study considered the Web to be an exciting and evolved resource. It simply kept growing bigger, in their view, but wasn't evolv*ing* as an increasingly complicated environment that largely benefited commercial interests. Moreover, search engines seemed to work just fine for their purposes. Whitmore, and to

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[14] Webivor was developed by eSchool Solutions and is available by subscription

a lesser extent, Stroh, Lowell, and LeRouge, however, addressed the Web as a more complicated environment and worked hard to give their students adequate skills in negotiating this environment.

Considering all of these efforts to make sense of the Web and integrate Web content into school assignments—pre-selection, power searching, Web page evaluation, and various (albeit spotty) discussions on Internet privacy and profiling—I now turn to these educators' students. How were students determining what information to use for their research, and addressing the Web overall? To what extent were the students heeding their teachers' suggestions? What were their teachers up against? As with the educators, I organized my student data according to my three research themes: a) a huge reliance on search engines, b) considerable exposure to Web page evaluation strategies, and c) a nonchalant attitude towards online commercialism.

Students

Relying Upon Search Engines

Almost every student participant in this study used the Web for all or nearly all of their school-related research. Indeed, all but a few students professed to be extremely comfortable typing in key words in search engines and sorting through search results. As I observed students in sixth grade, eighth grade and 11th/12th grade intently searching for factual online information during numerous lab research sessions, students spoke to me about their online searching habits. I found that elementary students preferred to use Yahoo!, Alta Vista and Excite when they weren't automatically steered to the

Yahooligans! subject directory (something that most often happened in the youngest grades). Meanwhile, the junior high and high school students had experienced a greater range of search engines, including Lycos, Search.com, Dogpile, Google, BigFlight, Ask Jeeves, Sherlock, and Goto.

Rationales for picking a particular search engine varied depending upon a students' Internet experience level. For example, less experienced users tended to settle upon the most popular search tools like Yahoo! because they sensed it was the most popular and therefore the best ("I see it on TV a lot. My cousin uses it. My mom uses it. So I'm just going to use it ") or b/c they were taken by the advertising ("It first got me in by the dog. I have to admit I like the dog. And I went into it"). More experienced users had experimented with a variety of search engine options. Some picked the search engine they felt seemed the most "professional" (Lycos was described this way numerous times) or picked one that, like Search.com, was quicker for them to type out. The most experienced user in this study—a junior high student—routinely progressed through a range of search engines and directories: he began with Alta Vista because he felt it gave him the broadest scope and offered the most accessible Web site summaries; then he turned to Yahoo!(the search engine, not the directory) because he felt it was a little more focused. Finally, he turned to an encyclopedia Web site like Britannica.com or Encarta.com, to narrow his search even further.

Both the junior high and high school students overwhelmingly spoke to the ease and convenience of search engine research. "Oh, I think it's a lot easier than having to go and find books and look through the books," one high school student, Ron, told me. "The way you can skim it on the computer, it doesn't take as long to find it. All you have to do

is type in a few words and there it is. You've got people (sic) there." Not leaving one's seat had definite appeal in the hunt for factual information. Students regularly turned to the online magazine data bases that the school library subscribed to, where they could find current articles on a range of topics. They were clearly more impressed with the immediacy, scope and currency of search engine result lists, however, even if a search produced a sometimes overwhelming number of hits. "I'm looking up basketball so I just type in "basketball" and I search for it," Jeremy, a junior high student, said, as he searched his topic on Alta Vista and instantly gleaned nearly four million hits.

The length of these lists never seemed to matter to students because they believed that the most relevant sites appeared at the top of the list. While some students carefully read Web site summaries before linking to a particular site and skipped around a search engine list, most systematically began at the top of the list and went down, disregarding some links that seemed obviously irrelevant, but opening up many of the Web page links as they came to them. Many students had a benchmark stopping point when they would desert a result list and try a new search term or combination of terms: students rarely went beyond the first three pages of a search engine list. "I usually just view the first page," Ty, a high school student, said. "I don't go on. If it says you can go to the next ten sites, I just stay with the first page." Another student, Lamont told me, "[I stop] if I don't see anything on the first page. They get less relevant as you keep on going farther, so I'll just go one or two pages." In general, the students I talked to had faith that the search engines they used would give them good results within the first few pages of a search engine list, if not the best, most thorough, and most current information of any available library resource. "I usually trust all of them [search engines]," Jeremy said. "I

don't usually NOT trust anything. I don't usually come up with anything that is bad or anything."

Negotiating "Quality" Content

All students I spoke to had been taken through specific classroom units on Web page evaluation at the time I interviewed them. On a few occasions I interviewed them as they were working through an actual Web page evaluation checklist. Consequently, all were familiar with advanced searching skills and Web page evaluation strategies, although the junior high students may have been less up-to-date than their high school counterparts. Stroh and Lowell lamented that they left too much of a gap (a full month) before they were actually required to apply searching and evaluation techniques in their Web research. This gap didn't seem to matter much, however, because the conclusions I gathered from the junior high school students and the high school students were remarkably similar: students seemed to be barely touched by their teachers' efforts to teach them discerning searching and Web page evaluation skills. Instead, they had developed a consistent set of habits that seemed to emerge from their penchant for finding all the information they needed without leaving their chair, the speed and ease offered by online search engines, and the fun and interactive promise of Web. Consequently, instruction or not, students had their own take on pre-selected sites, power searching strategies, and Web page evaluation.

Pre-selecting sites. Students didn't complain when teachers pre-selected Web content and introduced these Web sites to the class. On these occasions, the Web sites

were directly related to in-class discussions and most often served as visuals to punctuate a point. When students were doing their own fact-finding for their own research, however, they uniformly avoided pre-selected content (in the form of subject directories organized by content experts) because they perceived these lists to be too time consuming to get into and too limited in scope. Sometimes students came across such sites on their search engine result lists and linked to them quite accidentally. They were immediately disgruntled because the sites required them to type in their search term one more time within a new database, putting them one or two steps away from the relative comfort of their search engine list. They were also suspicious that pre-selected content didn't give them the "whole Web," and thought they would miss out on important information. Ironically, these tools often supplied students with exactly the type of factual and simplified information they were looking for, but as this was not directly evident, they quickly gave up and returned to the back-and-forth ease of their search engine lists.

Power searching the Web. Even though most of the students I talked to had gone through a Boolean orientation or, as with the "Electronic Technology and Learning Class," a comprehensive tutorial on Boolean terminology, students chose not to "power search" as they researched for online information. When I asked them what they did when they got a list of over 50,000 search engine results (which was typical), I would get answers like "if there's a ton [of hits], I try to narrow it down by using 'ands' and 'ors' and all that kind of stuff," or "you kind of put quotation marks around the thing you mainly want, and that should cut it down," indicating that they did indeed remember certain elements of Boolean terminology they learned in class. However, after many

sessions observing these students using search engines, I saw no evidence of them using their advanced power searching skills. Most often they typed in one word related to their research topic, like "basketball" or "volcanoes" and gleaned hits often numbering in the millions. One girl researching stars and galaxies on Yahoo! typed in "stars" and yielded about six thousand hits, including Web pages for Star Trek, Star Wars, and male porn stars. If she remembered power searching techniques, in practice she didn't use them, resorting back to her more familiar habit of typing in a singular search term and instantly getting thousands of results. As Ron, a 12th grader said as he was looking for information on car design, "I just type the main thing I'm looking for (e.g., "car design") and I go and look for things that seem to go with it."

Evaluating Web Pages. All the students I observed were required to find factual information during their online research sessions. Students were working under a huge range of topics. At the junior high level, they were researching science-related themes such as tectonic plates, volcanoes, and galaxies; literature-related themes such as Edgar Allan Poe and Hans Christian Andersen; and other topics such as basketball history. At the high school level, students chose an even wider range of topics, including the Holocaust, UFOs, Aviation, Violence in Sports, Music Censorship, the Ebola Virus, Ecstacy, 20s Culture, Communism, and Waste Management. For the purposes of their projects (and in the context of the Web page evaluation unit in which these projects were assigned), they had to use information that they felt was reliable and authentic, and document their sources for their final project.

Clearly, some of Stroh, Lowell, and LeRouge's teaching had penetrated students' thought processes as they searched for online information or considered Web content for their assignments. In asking both junior high and high school students what they defined as a good Web site for their research, a number of high school students echoed LeRouge in prioritizing objectivity: "I think a good web page is like, how they explain both sides of the conflict, like for or against or whatever. And then they'll have like facts about it and stuff," Ted, a 12th grader, said. Similarly, Dina, an 11th grader, was privy to sites that were "not all gunked up by opinions and that kind of stuff." Other high school students cited author credibility as their high standard for a "good" Web page. "If it's quoted by like, people that you know, that are like reliable sources," Lamont said, "then I'll actually use it." Jess also noted the importance of contact information on a Web site, and whether or not an author was a known name rather than just some individual. For these students, truth and credibility seemed important to them when they spoke to me. But when I inquired a little further: "do you actually go out of your way to determine a site reliable?" they said they did not—unless they were required to do so in class.

Furthermore, some students were applying their own method for determining author credibility that had nothing to do with Stroh, Lowell, or LeRouge's teachings. "If it's got information on it, I'll go for it, as long as two pages match up," Matt, an eighth grader, said. "I like to see if two pages match up. Like if I have one page with this information and another page with this information, if both of them have basically the same information." Two other students, one in junior high and one in high school, also said basically the same thing in completely separate conversations: "You know it's true if more than one guy agrees, or if more than one person agrees on it."

Overall, this was a theme during this entire case study: Teachers laid out particular strategies for searching the Web and evaluating Web content, and students adhered to their own set of online research criteria that had to do more with speed and the Web page's design than the actual content on the page. With these competing notions of validity, and with speed and design dominating student research efforts, issues of URL domains, author credibility, accuracy, objectivity, currency, and coverage, fell very much by the wayside.

Speed. As I have already observed, students' patience for sifting through search engine lists stopped at the second or third page, and students were more prone to use search engines over subject directories because they believed they could get what they were looking for much faster. The drive to find Web content as fast as possible was prevalent in all the grades, I found.

As I observed sixth grade students search the Web for images and facts for a unit on Wetlands in Melanie DeBower's class, I found their approach to Web material, which they were busily importing into a Hyperstudio stack, was akin to cutting out pictures from a magazine and gluing them onto posterboard. Student pairs moved quickly through the Web, locating pictures of herons and alligators, or sentences relating to the wetland environment they were investigating, and slapping them onto a hypercard. Speed was such an issue that some students, thinking they could find a page faster than their partners, often grabbed the computer mouse from each other.

These students' single-minded mission to locate applicable photos and text had a consequence. They did not make distinctions about the kind of pages they were on, be it

an EPA government site or a commercial tour guide site for the Everglades. Students treated the Web as a stockpile of information at their complete disposal, and the faster they could find the information to complete their assignment, the better.

This emphasis on speed continued at the junior high and high school level. Despite discussions about domain conventions and author validity, students were too much in a rush to care about the site evaluation criteria they learned. For eighth grader Kevin, a good site was one that had "the information that you want and that you need." For eighth grader Bryan, "If it's got information on it, I'll go to it." Once again, their task—finding photos and short descriptive sentences quickly—allowed them to treat the Web as a neutral space and Web page data as information for their taking, regardless of where it came from and regardless of what context it was framed in. As such, Web page domains were irrelevant to these students; Web sites were merely a huge collection of words, facts and pictures that needed to be located (as quickly as possible) and assembled for academic purposes. "I just kind of go where the information is," Liz, who was searching factual information on Aviation, told me, even though she had sat through LeRouge's class period on Web page evaluation and had completed an assignment on Web page credibility. "I don't really care where it comes from."

In their quest for speed, students assigned credibility to Web sites that were well organized and easy to move around. "I don't like the [Web pages] where you have to keep clicking and clicking to get to it," Dina, an 11th grader, told me as she searched for online information on 1920s culture. "I can usually tell if it's not really credible just by how it's set up," Ty told me while searching for Web sites about violence in sports. "Like this looks pretty credible. If it's a big site and it's nicely done. And it's got a lot of

links and stuff, and you can contact them, it seems pretty credible." A well-organized site was more "professional," and was thus more credible. No matter how professional the site looked, too much deep-linking into a site was intolerable for many students. "Some other sites I've looked at kinda beat around the bush before it gets to the main point," a high school student wrote in her Web page evaluation critique. "This site tells me info right from the start." The page, in her estimation, was credible while other pages were not. As Eighth grader Jeremy told me, "if it's not well-organized, I usually get out if it."

Beyond organization, the length of the reading material on a given site was also a measure of usability. Students looked for "short and sweet" information—the more succinct the information, the speedier it was to read and assess. Students looked for Web sites with all the information they needed laid out on the first (home) page. Corporate press releases often satisfied this need, as did short academic articles often connected to university course syllabi. Accordingly, the students I observed habitually steered away from Web pages with "too much information," and constantly turned to pages with the most user-friendly, simplified content for their research projects. For Nick, a Web page that required a bit of reading had too much information and was not worth reading. In this vein, students demanded a lot of pictures to supplement the "short and sweet" information they were looking for. A good page, then, was also one with lots of pictures.

Although high school students curdled at personal pages and Web sites created by the K-12 community ("that's a kindergarten page!"), the junior high students constantly relied on these sites for their information, even when Stroh and Lowell advised them not to. "I always like the home pages almost better because, I don't know, I feel like I get

more information," eighth-grader Jeremy said, explaining that you don't have to start from the beginning of the page and have to go into the site." On many levels, personal and school-related pages offer the most direct information with the least amount of distractions. They are usually compact, don't take long to load up, have a clear purpose because they are often devoted to a singular topic, and often get right to the point. "There was this home page I was at yesterday," Ashley, an eighth-grader, commented while surfing. "It was some girl's home page, and it told all about stars...it was kind of cool....it was a nice page." Ashley ended up using the page for her final project. In fact, most of the eighth graders had located personal or K-12 pages and used them as credible sources for their final Web page design project. The junior high students' reliance on personal pages would be the only significant difference between the grade levels.

Design. A second broad criterion students tended to use to determine a Web site's credibility was the site's design—especially how appealing, fun and cool the site looked. A professional-looking design, as mentioned above, made the Web page seem more credible, but students were also drawn to "flashy art" and pictures, which they often felt was a positive feature of any Web site. For example, Jeremy, an eighth grader, found two Web pages that contained the exact same information: one version was in plain text format and the other version was more engaging, with a thick white font against a wood-paneling-type background. "See, I would probably like this site better just because of the background," he told me, clearly impressed by the page. Jeremy ended up using this page—created by the Kansas Heritage Center for Family and Local History—for his

research.[15] The logic was apparently this: If a Web page author had put a little more time into the choice of a background, then he or she put more time in providing legitimate information.

When students ventured a critique of Web sites (as came up a few times in the eighth grader's Domain Search Activity papers), they most often based their critique on the site's design, not the information on the page. In observing the non-profit Internet Public Library Web site and its extensive and comprehensive newspaper database[16] for his "Domain Search Activity" paper, eighth grader Mark complained that the site was too boring to be worthwhile. "I have no pictures or anything interesting to look at," he said. "They don't even have a neat background." Correspondingly, Mark described a school site on mummies as incredibly appealing, but it was the site's design, not its validity or coverage, that appealed to him:

> I like how this page is set up. They have a lot of buttons to pick from and they are neat little pictures. They also have a little info about what time period they cyber mummy was baried [sic]. They also have some kind of hieroglyphic things at the bottom. They also have a little sun thing in the background that looks really cool.[17]

Carla, an 11th grader who was doing research on tattoos, also defined a quality site in terms of the way it was set up:

> Like when you first look at it, if it attracts me, if it's colorful to look at...if it's not, I move on.

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[15] See http://www.ukans.edu/heritage/graphics/people/naismith.html.

[16] See http://www.ipl.org/reading/news.

[17] See http://www.cmi.k12.il.us/Urbana/projects/cybermummy/archaelogy.html

For many students, appealing graphic components often included games or shopping opportunities. They commented on the ability to buy things—on a museum page, for example—as being a positive element of the page. "It's cool because you can win skateboards and other cool skateboarding stuff," one eighth grade student wrote for a Domain Search Activity description. "You can buy new boards and shoes...the pictures in the gallery are cool too. In all, it's a really good site."

Accepting Online Commercialism

Most teachers didn't critique the Web as a whole, so it was not surprising that students didn't either. Like teachers, many students found online advertising annoying, but not necessarily a problem. Many felt that interactive ads and contests added to the fun of being online. This was true even as these very elements deterred their school-related tasks.

Online advertising. In many ways, students had similar responses to their teachers about banner and other advertising: they were annoyed by it but felt they were generally impervious to advertising and/or savvy enough to deal with it. "It doesn't bother me," and "it's everywhere," were typical responses. "They really have to maintain the site and in order to do that they need to make some money," Alex, an eighth grader said. "I don't mind, either. As long as it's not in the middle of my screen, that's fine." Not one student I talked to complained of the flash animations and other interactive, eyeball-catching advertising screens. Eighth-graders Seb and Jeremy said they liked the advertising, calling it "fun," "catchy," respectively. The sixth graders I observed search

Voter.com for presidential election information at Hillup, seemed fully capable of ignoring a banner ad for the AT&T WorldNet Service that featured an animated red car dropping into the banner screen over and over again, and urging the user to "click here" to subscribe to the service and potentially win a car.

What was clear from watching and talking to the students in this study, even at the elementary level, was that they weren't as impervious as they wanted to be. The same sixth graders who ignored the red car became engaged by an ad for "free" newsletters. The ad appeared with a page that contained pure text and no pictures, making it the most lively element on the page. "Hey!" he called out to his two friends (who were sitting on either side of him). "I can get a newsletter sent to my home. Look up here." Other students, all eighth graders, admitted to clicking on certain ads if they seemed interesting. Some clicked on ads quite by accident. Kevin, an eighth grader, for example, had told me ads were not distracting to him, but repeatedly found himself on commercial sites thick with advertising messages and shopping appeals, all of which slowed down his hunt for useful information. Kevin often clicked quickly without reading the link tag, and frequently opened up ads (pop-up screens and entire Web pages) by accident. On one occasion he was caught in an advertising loop after he accidentally opened the pop up ad for "BuyBuddy.com—register to WIN!!" on a magazine site called Ecoworld,[18] and couldn't get out of it. Likewise, Ashley became immersed in GeoCities, a Web page building service owned by Yahoo!,[19] which she had actually clicked on from a commercial science information site on Jupiter (http://planetscapes.com).

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[18] See http://www.ecoworld.com

[19] See http://geocities.yahoo.com

Consequently, even if they were successful at ignoring the bulk of the advertising, most students complained at the nuisance of closing box after box of advertising in order to finally access the desired Web page—another indicator of their passion for speed. As these two high school students observed:

> A lot of times like an ad will come up and you'll click out of it, and then like you say you'll click on something else on that page, but then if you have like the backbone, then it'll [the ad] will come up again. And that gets annoying. Like sometimes if they pop up, like 8 or 9 will pop up, and if you click out of those, more will pop up, so...And they do get annoying, but...

> Oh, I'm always clicking commercials OFF. They are so annoying. And they come up every single time you click on a different page, like, if I just click here, a commercial will come up. And I hate the ones that just pop up, and I can't get rid of them. So they're very annoying...I hate the ones that, the pornographic sites that come up...you're searching for a topic and that stuff comes up and "I don't want to see that," that's gross.

Students were resigned to the presence of online ads, then, but in having to proactively take the time to click off online advertisements, their fact-finding efforts were regularly impeded. As one eighth grade student, Ed, summarized, "I try to stay away from them, cause when you're doing work, you look at that and it might be interesting, and then you don't go back."

Profiling and marketing schemes. With or without in-class discussions about online privacy issues, a significant number of students at both the junior high and high school level were drawn to games and contests, and freely disclosed to such Web sites their contact information, as well as various consumer and lifestyle preferences, without a second thought. Lamont, a high school student, regularly played contests if they took two minutes or less to play; Bryan (8th grade) acknowledged that "they pull you in

because it's fun. I like doing fun stuff like that"; Jeremy (8th grade) filled out contests to win magazines, and Mandy (high school) had given her email address out so many times she had become inundated by spam:

> Mostly it's like the gross porn crap, that if you click on it they are like...[sarcastic] that's okay. But like magazines, Alloy, I get like something from them all the time and I don't know why. And I get, I get spammed on one of my emails, it's like the "tree loot" thing.
>
> BF: The tree loot thing?
>
> MI: yeah. It was on a banner and it said "hit the monkey and win $20."

Tree Loot, as I would learn, was one of the most popular game-advertisements on the Internet at the time this study was conducted. The company responsible for Tree Loot, Virtumondo, places banner ads all over the Internet inviting users to "Shock the Monkey and WIN" as the company's mascot, a geeky-looking cartoon monkey, bounces back and forth across the screen. Users who click on the ad are then introduced to the Tree Loot game, where they click on a tree and try to uncover "banana bucks"—up to $25,000 if they're willing to put in the time; banana bucks in $20 increments. Banana bucks can be redeemed for real prizes (e.g., digital watches, stuffed monkeys) as long as visitors fill out a long survey that identifies their address, educational background, income, hobbies, and 70 other "interest variables."

As I found from observing students doing online research for their school projects, the Tree Loot banner ad was one of the most prevalent ones I saw.[20] The game was advertised (sometimes more than once) during four of the 20 student searches,

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[20] The Tree Loot Web site (www.virtumundo.com) earned a spot on the "top 50 most visited Web sites" list provided by Media Metrix in 2000.

reaching a fifth of my entire data pool. Indeed, most of the students I talked to about Shock the Monkey/Tree Loot had heard of it. Bryan was researching Hans Christian Andersen when he came across the Tree Loot game:

> Bryan: Oh, I LOVE this stuff! (He clicks on ad...and it says "you won $20!).
>
> What it is, is, if you shock the monkey you get $20, you just have to punch the monkey, and catch the monkey, and kill the Pikachu, and stuff like that.
>
> BF: Really? What's it for?
>
> Bryan: It's for, I think it's for Bananatree, let me check. (types in Bananatree...) I LOVE going to these. I've got, they still owe me like a lot of money!
>
> BF: So what is Bananatree.com?
>
> Bryan: It's like a site where you get to go and you have to guess where money is, and they have like thousands of dollars but you can only go on their site and spend it, and you can get $20 off or something. It's cost like $2 banana bucks or something, and you can't get one thing twice. Oh man, is that how you spell banana?
>
> BF: Yeah...
>
> Bryan: Well I want to get here...they said I won $20 bucks, how do I get there? That's agitating!
>
> BF: So it's banana money, it's not real money.
>
> Bryan: Yeah, it's just....
>
> BF: And then what do you do with the money?
>
> Bryan: You go onto the Internet and, Oh, there it is...Tree Loot! This is *Tree Loot*, duh! Oh, man, now they're doing the one man shock, they did this last week. How you do this, you go on and you get money. Here's how it starts, let me show you (clicks on the tree). You have that, and there's this huge tree, and if you guess where the monkeys are, and then...they put that there just to fool you
> (some symbol on the tree) ....And you put in your name and you have to sign up and everything.
>
> BF: So you put in your name and your email and everything.
>
> Bryan: Yeah, and then they send you stuff, and my email is so...My email can only be accessed at home, and it is SO LONG.

BF: So what kind of things do they send you?

Bryan: They send you like, "we've got a new thing this week and...you know..."

BF: Do you have a sense that they've passed your email on to other companies?

Bryan: Sometimes I do, but if I ever get anything from somebody I basically don't know, I've learned from basic preferences not to open it. So....I've opened stuff I don't want.

BF: Have you actually ever won anything online?

Bryan: Yeah, but they never emailed me about it.

BF: Oh really?

Bryan: Yeah, I won a gift certificate for Blockbuster.

BF: Oh no!

Bryan: Yeah, I know, it was for a couple of free movies, and I wouldn't have to buy them, and video games, and I like video games, I like to play video games.

BF: You won a video game? So how often to you go on this Tree Loot?

Bryan: If I have any extra time I always go on here, it's just fun.

BF: How did you find it in the first place, just from the advertisements on top?

Bryan: Like they give you a shot at punching a monkey if you go to their sponsors. They do stuff like that. If you punch the monkey you can put $75 in your pocket.

BF: So they have ads all over the place then.

Bryan: Yeah, then they get you into it, and you just click...you just keep it...See then, it says "hey friend, welcome back." Did I win anything? No!

BF: So what do you think about all this stuff on the screen that's beyond the information that you're trying to look for? Do you tend to click on stuff that moves just because it's fun, or you're curious?

Bryan: Sometimes, if it looks fun I probably would. I'm not one to click on something like that (he points to a "Casino" banner ad).

BF: So that looks kind of dumb.

Bryan: Yeah, kinda! This looks fun but still I can't do it because I'm not exactly the rightful age to be on that site. I've been there before and you have to be 18 and a credit card holder.

BF: Have you ever bought anything online?

Bryan: I have coaxed my mother to help me so I can get something else in return but she keeps saying no because you always need a credit card.

(Bryan continues to play the Tree Loot game)

Bryan: I know I've got $5 in here somewhere…

BF: So you can keep coming back and trying…

Bryan: Yeah, you can try the whole day, and they just give you tips and you win money, and see, well I can't catch them, I'll show you, and it'll give you a list of stuff and then it'll say "we're going to email you tomorrow about it…" That's basically it. That's how they pull you in like this!

Of course, Bryan was avidly playing Tree Loot as he talked to me. Perhaps because of my questions and his zeal to explain the game to me, Bryan may not have played at such length during class time—the other three students ignored the invitation to Shock the Monkey as they conducted their online research. Clearly, however, the ad and the game were enticing for Bryan, who played games like Tree Loot and Kill the Pikachu regularly. Interestingly, Bryan seemed to be quite aware that playing games and entering contests led to email spam and used various strategies to "pull you in." Even so, he was clearly taken by the promise of real prizes, and played games whenever he had the chance. When it came to researching Hans Christian Andersen or playing Tree Loot, one thing is for sure: Bryan was much more focused when he was playing games.

Lengthy and commercialized search engine lists. Students searching online often generated lists with thousands and even millions of search engine results. As I have established, they didn't tend to use Boolean operators to narrow down the list.

They also had faith that the most relevant search engine results appeared at the very top of the list—on the first or second page. In their view, there was little point in narrowing down the list if the most relevant sites appeared at the top anyway. What wasn't obvious to them was that for most of their searches, multiple links led to the same sites, bulking up the first few pages with a remarkable amount of redundancy. For example, Wes (11th grade), who was conducting research on Ebola, found that most the relevant-sounding pages he opened led to the same set of documents published by the World Health Organization. Jess was having a similar experience in his research on the Nuremburg trials. "It's all like the same thing," he said. "Like it's a different person who put it on the Web, but it's like the same articles, like it's written by the same guy and they just copied it."

Another thing that wasn't obvious to students doing online research was the high number of commercial sites at the front end of their search result lists. Of course, different topics influenced the number of commercial hits students got at the top of search engine lists, and students searched the Web under a wide range of topics. If they were investigating Waste Management or Communism, for example, they received fewer commercial hits than Basketball History or Tattoos. All the same, students were inundated by commerce sites. Alex, who was searching for volcanoes, waded through Web sites on hotels, movies, volcano tours and science superstores (he had typed in "volcanoes"). Mick, who was investigating Edgar Allan Poe on the search engine Dogpile, had to read through 16 link summaries before he came to a page that gave factual, historical information about the author. Kevin, who was searching for information on ocean life, was lost in a maze of shopping pages. Instead of carefully

reading the summaries beneath the Web sites, Kevin clicked on "Great Ocean Decorations," which led him to "Nautical Seasons: Enter Our Store," which led him to "Barnacle Kove—We ship to your door," and then another shopping site. At one point Kevin said with resignation, "Every site you go to almost is trying to sell you something." Will (11th grade) was searching for Ebola and came across site after site by the same author, Dr. Len Horowitz, from Tufts, marketing his books on the topic. Similarly, Seb (eighth grade) was doing research on the Rock Cycle and came to a site with pictures of rocks and minerals aligned on a grid. "This is a fossil site," he said, reading on. "I thought I just could get some pictures. But it's...just selling stuff. I thought it had more information on it." When I asked him if a lot of the sites he visited were trying to sell stuff, Seb echoed Kevin, saying "Everybody is trying to sell you something."

In addition to clicking on the many commercial sites within a given search result list, students clicked on the "sponsored links" featured in nearly?? all search engine result pages. The three or four "sponsored links" before the actual search results begin has become a standard element of commercial search engines. They are paying sites and further add to the commercialism on the Web, while crowding out educational and nonprofit sites, which likely aren't paying for placement. At the time this study was conducted, the search engine Alta Vista, for example, subtly distinguished its sponsored links from the rest of the search results by color—green for sponsored, blue for search results. Despite the distinction, I observed students trying them out, believing that any site listed at the top of a search engine list was worthwhile. Even those who fully

recognized that these links were sponsored selected them regularly. As eighth grader Jeremy searched on Alta Vista, for example, we had the following conversation:

Jeremy: These green ones are sponsored ones.

BF: So these are sponsored listings, and they come first?

Jeremy: Yeah.

BF: So you don't really go to those?

Jeremy: Well I try them out, but usually they're not very good.

BF: Really?

Jeremy: Yeah.

By 2001 Alta Vista used an even more deceptive strategy to separate the sponsored links from the other search results. The company replaced both the blue and green colors with light gray, and left a fine line—three indistinguishable dots—between sponsored and non-sponsored sites. If students were already taken in by sponsored links clearly designated by a different color, they would likely be taken in even more by sponsored links with barely any distinction at all.

As I watched students conduct their online research during class time, I observed many futile and frustrating searches for information. Even though the students I interviewed remained committed to doing online research—nearly every student I talked to relied almost completely on the Web for their research information—a small number admitted that libraries and magazine databases were serving them better, at least for the subject they were currently investigating. For these students, the Web was no library, or information highway, with all the information they needed at their fingertips. As Nick, who was doing research on sports violence and was completely dissatisfied with his searching experience, summarized:

> I don't know, it reads just like an advertisement for things. It's hard to find information for you to really use. That you know is true....It just looks like one big advertisement to me. I try to spend as little time as possible on it.

From Nick's point of view, the Web was a commercial highway complete with billboards, strip malls, information potholes, and the same big chain stores over and over again.

Even so, most students did not experience Nick's frustration: they were more comfortable wading through ads, shopping pages, and redundant sites than they were wading through more comprehensive texts on particular topics. They were sure they were using the most comprehensive information resource available, and they didn't even have to leave their seat.

Conclusion

Most research on school Internet use has focused on the Internet technology itself and the process of using various Internet-based tools in a classroom setting. As Burbules and Callister (2000) have observed, the rhetoric of technology in schools is bipolar. Educators either celebrate the technology as a means for revolutionizing learning (along with their alibis, industry backers), or argue that there is no place in school for hi-tech resources (e.g., Larry Cuban, in his recent book Oversold & Underused: Computers in the Classroom). Discussions about the content available through the technology, or the ways students identify usable content, has been, if anything, an afterthought. The small body of literature that discusses content, mostly by librarians, focuses on the problem of excessive content and offers ways to negotiate inevitably long search engine lists and untrustworthy Web sites. Essentially, this academic work reads more as how-to

instructions for an easily-solved problem than an in-depth analysis of Web content and the role of Web content in education. In other words, scholarship on the information highway's information has been negligible.

When Web content is addressed, as I have done in my research, a different picture emerges in terms of the future value of the Internet in education. By addressing the role of Web content in the classroom rather than the process of teaching with a particular technology, I was investigated the content teachers discussed and promoted in their teaching. I also looked at the content students selected for their research, and the way they navigated the commercial environment—the commercial content—of the Web.

With the exception of Hillup media specialists Jill Whitmore, who was creating her own subject directory, and the teachers of the K-4 grades, who pre-selected sites, the participants in this study found online search engines to be a satisfactory solution for their students' academic research. Likewise, students admitted to relying on the Web for nearly all their school-related research. They generally felt that it was somehow more inclusive than the other library materials at their disposal, and certainly more current. For them, search engines captured the whole Web, and the whole Web captured all relevant information.

This over-reliance on search engines is problematic for two main reasons. First, the Web has limitations as a complete resource. Students found a tremendous amount of information, but not the kind of information they necessarily needed for their research projects. In many cases, a comprehensive book on a particular topic area would have been more helpful. Second, search engines certainly do not give students "the whole Web" because of the way search engines operate as commercial ventures—stacking the

first pages of result lists with sites that pay for placement—and because of the way students search. Even if students employed the Boolean and advanced searching skills educators taught in order to maximize their searches (they did not), students still tended to look at only the first page or two of a search result list, not beyond. These pages contained redundant and heavily commercialized Web content—not "the whole Web," as students supposed.

Educators attempted to help students combat misinformed and biased Web content by teaching them Web page evaluation skills. The teachers had excellent motives, showing students, for example, ways to determine whether or not a particular page contained compromised information. They did note commercial pages could be potentially suspect in terms of supplying credible facts. However, the guidelines they most often used—a known author or organization, the presence of contact information, proper grammar, the currency of information, and the page's popularity relative to other Web sites—were on the whole, insufficient markers of Web page credibility. A "known organization" could very well be a familiar corporate entity with its own business agenda. Moreover, contact information, proper grammar, and currency have become a mainstream standard in Web page design. If such Web page evaluation guidelines are helpful in weeding out "illegitimate" Web sites published by novice Web authors, they are pointless in helping students determine the legitimacy of polished corporate sites that are hugely invested in having an online presence, in appealing to target audiences, and in seeming as credible and trustworthy as possible. These are the very pages that will increasingly appear at the front end of search engine lists.

As distracting and misleading as the online ads and games seemed to student research, the most debilitating element was the search engines and the way students used them. Particular Web pages generated criticism among educators, but there was little concern about the ways students (and educators) located these Web pages, and about the Web's greatest bias: its growing commercialism as a whole.

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